TRANSMITTAL OF APPEAL BRIEF

Docket No.
09626/000L207-US0

In re Application of: Tetsuya Atsumi et al.

Application No.	Filing Date	Examiner	Group Art Unit
09/193,928	November 17, 1998	S. L. Blau	3711

Invention: LIGHT-WEIGHT SHAFT FOR GOLF CLUBS

TO THE COMMISSIONER OF PATENTS:

Transmitted herewith in triplicate is the Appeal Brief in this application, with respect to the Notice of Appeal filed: July 21, 2003 .

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Dated: February 20, 2004

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Docket No.: 09626/000L207-US0
(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:
Tetsuya Atsumi et al.

#38
3-2

Application No.: 09/193,928 Customer No.: 07278

Filed: November 17, 1998 Art Unit: 3711

For: **LIGHT-WEIGHT SHAFT FOR GOLF CLUBS** Examiner: S. L. Blau

APPEAL BRIEF

MAIL STOP Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Appellants submit this Appeal Brief in triplicate as required by 37 C.F.R. § 1.192. A Notice of Appeal was filed on July 21, 2003 in response to the Final Office Action mailed January 22, 2003. Appellants submit concurrently herewith the required fee for this Brief pursuant to 37 C.F.R. § § 1.192 and 1.17(f). It is believed that no additional fees are required for this submission. However, should it be determined that additional fees are required or that any refund is due in connection with this application, the Commissioner is hereby authorized to charge the required fee(s) and/or credit the refund(s) due to Deposit Account No. 04-0100.

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REAL PARTY IN INTEREST

The real parties in interest are the Appellants, Tetsuya Atsumi, Ikuo Takiguchi, Tsutomu Ibuki, and Katsumi Anai. Appellants are employees of Mitsubishi Rayon Co., Ltd.

RELATED APPEALS AND INTERFERENCES

Appellants' attorney is not aware of any other related appeals and/or interferences that will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

STATUS OF THE CLAIMS

This is an appeal from the Examiner's rejection of claims 1, 21, and 22, in an Advisory Action dated May 12, 2003. Claims 1, 21, and 22 are pending and are the subject of this Brief. The claims are set forth in Exhibit A immediately following this Brief.

STATUS OF AMENDMENTS

The Amendment submitted by Appellents on April 22, 2003 has been entered. no amend must

Appellents have not submitted an amendment subsequent to the Advisory Action of May 12, 2003.

SUMMARY OF THE INVENTION

As discussed in the specification, the present invention is a golf club shaft which is approximately 30 to 50% lighter than conventional shafts and maintains torsional strength properties of at least 120 kgf x m x degrees (page 1, paragraph 0017). The shaft is formed of fiber reinforced composite materials arranged in at least four layers. The layers consist of a first angled layer, a first straight layer, a second angled layer, and a second straight layer. Each angled layer is formed of two layers of fibers bonded together, with the angle formed between the direction of the

fibers and the longitudinal axis of the shaft. The second angled layer provides significant strength properties because its fibers are arranged at an angle of 35°-75°. The fiber arrangement maintains the flexural rigidity, flexural strength, torsional rigidity, torsional strength, and crushing strength of a typical golf club shaft, while also yielding a light weight.

ISSUES

The first issue is whether claims 1 and 22 should be rejected under 35 U.S.C § 103(a) as being unpatentable over US Patent No. 5,720,671 to Cheng in view of US Patent No. 4,682,504 to Kobayashi, JP 6-114131, and JP 9-140840.

The second issue is whether claim 21 should be rejected under 35 U.S.C. § 103(a) as being unpatentable over US Patent No. 3,646,610 to Jackson in view of JP 6-114131, US Patent No. 6,106,413 to Kusumoto, JP 9-140840, US Patent No. 6,126,557 to Preece, and US Patent No. 4,157,181 to Cecka.

GROUPING OF CLAIMS

Independent claim 1 and dependent claim 22 are believed to be patentable over the cited art for the reasons set forth below. Claims 1 and 22 stand and fall together. Independent claim 21 is believed to be patentable over the cited art for the reasons set forth below. Claim 21 stands or falls independently.

ARGUMENTS

(i) Rejection of claims 1 and 22 under 35 U.S.C. § 103(a)

(Issue No. 1) Claims 1 and 22 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Cheng in view of Kobayashi, JP 6-114131 (herein "JP '131"), and JP 9-140840 (herein "JP '840"). The Examiner asserts that Cheng discloses a layering pattern similar to the present invention, but does not disclose layers along the full length of the shaft or the strength and weight properties of the club in the present invention. The Examiner contends that Cheng in combination with Kobayashi, JP '131, and JP '840 discusses all of the elements of the present invention. The Examiner borrows certain full-length layering (Kobayashi and JP '131), weight (JP '840), and strength (JP '131) characteristics from each secondary reference.

Appellants respectfully disagree with the Examiner. The Examiner has not made a *prima facie* showing of obviousness as Cheng, Kobayashi, JP '131 and JP '840, alone or in combination, do not teach or suggest every element of the claimed invention. Rather, Appellants submit that the Examiner is improperly using hindsight to reject the claims.

The present claims are directed to a golf club shaft having the following structure:

Claim 1

The layers, as recited in claim 1, can be in one of three positions, parallel to the longitudinal axis (0°), perpendicular to the longitudinal axis (90°), or angled to the longitudinal axes (Θ).

TABLE 1

LAYER	ORIENTATION TO THE LONGITUDINAL AXIS
First Angled	Θ
First Straight	0°
Second Angled	Θ
Second Straight	0°

Thus, the number, orientation, and order of the layers result in the strength, flexural rigidity and light weight of the golf club shaft.

Prior to the arguments regarding the references, below is a table outlining the differences in the order of the layers between the invention of claim 1 and the prior art.

TABLE 2

Line	Invention	Layer 1 (1^{st} Ang)	Layer 2 (1^{st} Str)	Layer 3 (2^{nd} Ang)	Layer 4 (2^{nd} Str)	Layer 5	Layer 6	Layer 7
(A)	Present Invention	Θ	0°	Θ	0°	-	-	-
(B)	Cheng- Fig 2	Θ	Θ	0°	-	-	-	-
(C)	Cheng - Fig 2*	Θ	0°	-	-	-	-	-
(D)	Cheng - Ex.	Θ	Θ	Θ	Θ	Θ	0°	0°
(E)	Cheng - Ex.*	Θ	Θ	Θ	0°	0°	0°	0°
(F)	JP '131	0°	Θ	0°	Θ	0°	-	-
(G)	JP '840-1*$	90°	Θ	90°	90°	0°	0°	0°
(H)	JP '840-2*$	90°	Θ	0°	90°	0°	90°	0°
(I)	JP '840-3*$	90°	Θ	0°	0°	90°	90°	0°
(J)	Kusumoto	0°	90°	Θ	90°	0°	0°	-

* Note: Appellants combined two angled layers into one, as shown in Kusumoto.
$ Appellants only illustrated the first three embodiments for illustration purposes; the other embodiments are also dissimilar to the claims of the present invention.

The Examiner admits that Cheng does not disclose full length layers or the presently claimed torsional strength. Appellants submit that Kobayashi does not provide the motivation to one of ordinary skill in the art to combine Cheng with JP '131 to provide Cheng's golf club shaft with increased torsional strength. Kobayashi is silent about what is required to increase the torsional strength of a golf club shaft. Kobayashi only states in column 1, lines 13-25 that:

> Generally, a golf-club shaft is subjected to flexure and torsion when swung during play or practice. A golf player feels the degree of flexure and torsion as a shaft stiffness. A club shaft having small flexure and torsion has a stiff feel, and a club shaft having large flexure and torsion has a soft feel. Generally, a player having a strong swing can move a club shaft at a high head speed, and thus a stiffer club shaft, i.e., a shaft having small flexure and torsion, is more suitable for such a player. A player with a weak swing, however, moves a club shaft at a low head speed, and thus a softer shaft, i.e., a shaft having large flexure and torsion is more suitable for such a player.

Kobayashi merely recites that there is a difference between a club with a stiff feel and a club with a soft feel. Appellants note that Cheng's assignee, Harrison Sports, Inc., sells shafts that cover a full range of flexure. *See*, Exhibit B, Harrison Sport's website (www.harrison.com). Kobyashi adds nothing to the disclosure of Chang or to any of the combination of the references.

The Examiner states that Cheng discloses a first angled layer 22b/22c and a first straight layer 22a, and that Cheng discloses 10-20 layers and that the layers are repeated to form the layers of the claimed invention. Appellants maintain that Cheng does not disclose which layer should be the inner layer. The section of Figure 2 does not illustrate the "inside" of the golf club shaft or the mandrel. If Cheng's example in column 3, lines 9-12 is followed, one of ordinary skill in the art would use 5 angled layers and 5 parallel layers (*see*, Table 2, Line D, above), but Cheng does not disclose repeating the pattern set forth in Figure 2. Additionally, none of Cheng's layering suggestions match the layers disclosed in JP '131 and JP '840.

another example

disagree

Appellants further submit that it would require undue experimentation for one of ordinary skill in the art to arrive at the layers of the presently claimed invention. Cheng discloses using 10 to 20 layers. The layers can be positioned in up to four positions. The layers can assume the positions of being parallel to the longitudinal axis of the golf club shaft or straight (0°); perpendicular to the longitudinal axis of the golf club shaft (90°) or positively or negatively angled with respect to the longitudinal axis of the golf club shaft (+Θ or - Θ). If the total number of

positions and layers are considered (4 positions and 20 layers) there are 160,000 different variations (20^4) of layers. Additionally, one of ordinary skill in the art is not motivated to just substitute layers of a different orientation because each specific orientation confers a specific benefit to the strength of the golf club shaft. The references teach that the specific order of the layers may also be important and one of ordinary skill in the art is not motivated to act contrary to that teaching.

The Examiner notes that the present invention and Cheng use different counting conventions to determine the number of layers in a golf club shaft. Appellants recognize the two disparate conventions. Cheng discloses from 10-20 layers in his shaft due to his convention. Cheng's 10 layer model would be counted as a 7 layer model under the convention of the present invention. However, the layering patterns are by no means comparable, as addressed in this brief and as most notably illustrated in Table 2.

Further, Exhibit B demonstrates that Cheng's assignee, Harrison Sports, Inc. does not sell a graphite golf club shaft lighter than 50 grams in weight. *See*, Exhibit B, the "SL 50 Series". Cheng's golf club shaft is not used to make a club of 30 to 40 grams in weight, as is disclosed in the present invention. Accordingly, one of ordinary skill in the art is taught away from lightening Cheng's golf club shaft below 50 grams.

The further combination of JP '131 and JP '840 also fails to render the presently claimed invention obvious. The Examiner states that, in view of Kobayashi, one of ordinary skill in the art would be motivated to modify Cheng to select a golf club shaft with a torsional strength of at least 120 kgf x m x degrees (JP '131, Table, page 4) and a weight of 30 to 40 grams (JP '840, Abstract).

JP '131 discloses a different layer structure than both Cheng and the presently claimed invention. JP '131 discloses, in Figure 1, four layers; 0° layer 51, + Θ layer 52, 0° layer 53,

and - Θ layer 54. JP '131's layers are ordered differently than those of both Cheng and the present invention. Furthermore, JP '131 does not disclose any weights for his golf club shafts in relations to their strengths. Thus, JP '131 does not teach that a golf club shaft can achieve a twisting strength of "230 kgf cm" and remain between about 30 to about 40 grams in weight.

JP '840 discloses golf club shafts between 10 and 50 grams but none of JP '840's embodiments disclose the layers of JP '131 or the presently claimed invention. *See*, Table 2, lines G, H, I, above. The Examiner is improperly selecting disparate parts from the two references to "piece together" the presently claimed invention using hindsight. It is improper to combine the references for their individual properties regardless of the layer structure disclosed. Deviation in the number, orientation or specific order of the layers of a golf club shaft will alter the physical properties of the golf club shaft.

Accordingly, it is believed that this rejection should be withdrawn.

(ii) Rejection of claim 21 under 35 U.S.C. § 103(a)

(Issue No. 2) Claim 21 stands rejected under 35 U.S.C. § 103(a) as unpatentable over Jackson in view of JP '131, Kusumoto, JP '840, Preece, and Cecka.

Appellants respectfully disagree with the Examiner. Jackson, Kusumoto, JP '131, JP '840, Preece and Cecha do not, alone or in combination, disclose every element of the claimed invention. Appellants submit that the structure of the invention, as claimed in claim 21, is as follows:

Claim 21

Further to the structure recited in claim 1, the angled layer can be comprised of sublayers which are positively or negatively angled to the longitudinal axis ($0° < \Theta < 90° = +\Theta$; $270° < \Theta < 360° = -\Theta$).

TABLE 3

LAYER	SUB-LAYER/ FIBER MATERIAL	ORIENTATION TO THE LONGITUDINAL AXIS
First Angled	First Layer	+/-Θ
	Second Layer	-/+Θ
First Straight	Third layer	0°
Second Angled	Fourth Layer	+/-Θ
	Fifth Layer	-/+Θ
Second Straight	Sixth Layer	0°

Prior to the arguments regarding the references, below is a table outlining the differences in the layering between the invention of claim 21 and the prior art.

TABLE 4

Present Invention	First Angled (Θ)		First Straight (0°)	Second Angled (Θ)		Second Straight (0°)	
	First layer 1 +/-Θ	Second layer 1 +/-Θ	0°	First layer 2 +/-Θ	Second layer 2 -/+Θ	0°	-
Jackson (Fig 15)	Layer 40' 0°	Layer 43' +/-Θ	Layer 43' -/+Θ	Layer 47' 0°	Layer 50' +/-Θ	Layer 53' -/+Θ	Layer 54' 0°
Jackson with "Chopped" layers	Layer 40' 0°	Layer 42' Θ	Layer 43' +/-Θ	Layer 43' -/+Θ	Layer 46' Θ	Layer 47' 0°	Layer 49' Θ
JP '131	Layer 51 0°	Layer 52 +Θ	Layer 53 0°	Layer 54 -Θ	-	-	-
JP '840$	Layer 1	Layer 2	Layer 3	Layer 4	Layer 5	Layer 6	Layer 7
Ex. 1	90°	+/- Θ	-/+Θ	90°	90°	0°	0°
Ex. 2	90°	+/- Θ	-/+Θ	0°	90°	0°	90°
Ex. 3	90°	+/- Θ	-/+Θ	0°	0°	90°	90°
Kusumoto	Layer 1 0°	Layer 2 90°	Layer 3a +/- Θ	Layer 3b -/+Θ	Layer 4 90°	Layer 5 0°	Layer 6 0°
Preece	Layer 11 +/- Θ	Layer 12 -/+Θ	Layer 13 +/- Θ	Layer 14 -/+Θ	Layer 16 0°	Layer 18 0°	Layer 20 0°
Cecka	Layer 11 Θ	Layer 12 Θ	Layer 13 Θ	Layer 14 Θ	Layer 15 Θ	Layer 16 Θ	-

$ Appellants only illustrated the first three embodiments for illustration purposes; the other embodiments are also dissimilar to the claims of the present invention.

The Examiner states that Jackson's Figure 15 discloses the first angled layer (43'), the first straight layer (47'), the second angled layer (50') and the second straight layer (54').

Appellants respectfully disagree. Figure 15 of Jackson discloses one of two arrangements. Neither arrangement discloses the four layers of the present invention.

One arrangement taught by Jackson is a five layer structure with a first straight layer (40'), a first angled layer (43'), a second straight layer (47'), a second angled layer (50') and a third straight layer (54'). However, present claim 21 recites that the first angled layer is orientated at an angle to the long axis of the golf club shaft while Jackson's layer 40' is parallel to the long axis of the golf club shaft. The Examiner also ignores layer 40' and improperly selects only specific layers. Neither Jackson nor the combination of Jackson with the secondary references disclose omitting the base layer of Jackson's golf club shaft. Omitting a layer would weaken and alter the properties of the golf club shaft. Jackson clearly discloses that that the first layer must be parallel to the long axis of the golf club shaft. *See*, Jackson, Figures 8, 13, 14, 15, and 16.

JP '131's layers, as discussed above, are different than the layers of both Jackson and the present invention and cannot be properly combined with Jackson for the reason discussed above. The number, orientation, and order of the layers are parameters which achieve the claimed characteristics of the present golf club shaft, including strength, flexural rigidity and light weight.

Additionally, the Examiner states that one of ordinary skill in the art would modify Jackson's golf club shaft to have sufficient layers extend over the entire length of the golf club shaft. Appellants respectfully submit that one of ordinary skill in the art is not motivated to extend the length of each layer. One of ordinary skill in the art would not be motivated to add layers, knowing the layers will increase the weight of the golf club shaft. Jackson discloses a golf club shaft weighing 0.31 pounds or 140 grams. *See*, Jackson column 4, lines 1-12. The claim of the present invention discloses a golf club shaft weighing from about 30 to about 40 grams. Jackson's golf club shaft weighs approximately 3.5 to 4.5 times more than the golf club shaft of the present

invention. Although Jackson clearly states that layers can be added, one of ordinary skill in the art is not motivated to add or subtract layers from Jackson's golf club shaft. Adding layers or the extending of the layers may be taught, but would only increase the weight of the golf club shaft beyond the weight of the present invention and reducing layers is not taught, and would weaken the golf club shaft.

The Examiner states that Kusumoto teaches a second angled layer between 0.04 and 0.1 mm as prepreg sheets not larger than 0.06 mm. Again, Kusumoto does not disclose the layers in the same orientation and order of the present invention. There is no motivation or suggestion that the particular reinforcement layers of Kusumoto would be obvious to combine with Jackson. Kusumoto's method of combining layers does not even approximate the features of the presently claimed invention. Kusumoto discloses AP prepreg, in which the fibers of the prepreg sheet are angled to the longitudinal axis of the golf club shaft, and SP prepreg, where the fibers of the prepreg sheet are parallel to the longitudinal axis of the golf club shaft. *See*, Kusmoto, column 2, lines 38-45. The intermediate sheet, which is the only sheet disclosed with a size no greater than 0.06 mm, is disposed between an AP prepreg layer and the SP prepreg layer. As illustrated in Kusmoto, Figure 2, the intermediate layer is a perpendicular layer (90°) and is sandwiched between an angled layer and a straight layer, or Kusumoto's configuration is Θ, 90°, 0° for the section surrounding the "second angled layer". Ignoring the fact that the Examiner is improperly attempting to choose one layer when the entire structure of Kusmoto is different, Appellants will just focus on the intermediate layer and its surrounding layers.

Claim was just showing layer thickness

The second angled layer of the presently claimed invention is located between two straight layers ("SP layers"), resulting in a 0°, Θ, 0° configuration. Kusumoto specifically teaches

that the intermediate layer is to be sandwiched between the AP prepreg layer and the SP prepreg layer.

> When a layer of AP prepreg ... is made to closely adhere to a layer of SP prepreg ... blow holes occur on an interface ... so that separation and damage tend to occur. However, when the thin layer of prepreg of high resin is provided between the layer of AP prepreg and the layer of SP prepreg ... it becomes difficult for blow holes to be generated on the interface. Accordingly, the occurrence of separation is prevented, and the mechanical strength between the layers can be enhanced.

Kusumoto, column 2, line 58 to column 3, line 3. Given the above, one of ordinary skill in the art is not taught to change the layers surrounding the intermediate layer and is thus not motivated to combine Kusumoto's layers with Jackson.

As stated above, none of JP '840's embodiments disclose the layers of JP '131, Jackson or the presently claimed invention. Thus, Appellants submit that there is no motivation to combine JP '131 with JP '840 and then additionally combine the two with Jackson. Again, the Examiner is selecting disparate parts from the two references to "piece together" the presently claimed invention using hindsight.

The Examiner is selecting individual features of Preece and Cecka and ignoring the overall structure of their disclosure. Neither of the references discloses the layering as disclosed in the present invention, or any other of the above cited references. Additionally, Cecka does not disclose straight or parallel layers and states the "orientation relationships between layers ... [achieves] the unique combination of properties [of the Cecka's invention]." Cecka, Abstract. Thus, one of ordinary skill in the art is not motivated to select any of Cecka's physical properties to combine with another reference without taking the entire structure that lends itself to the particular properties.

didn't have to

Thus, it is improper to combine Preece and Cecka with Jackson, JP '131, JP '840, and Kusumoto.

Appellants respectfully submit that some of the novelty in the presently claimed invention and the references is the specific number, orientation, and specific ordering of the layers. However, the Examiner is treating the mixing and matching of layers as obvious without any direct, and sometimes conflicting, motivation. One of ordinary skill in the art, in general, is not motivated to add or subtract a specific layer without direct teaching. The goal of all of the references is a light and strong golf club shaft. One of skill in the art is not motivated to add layers, which increase the weight of the golf club shaft, or subtract layers, which reduce the strength of the golf club shaft, without specific motivation. Additionally, one of ordinary skill in the art is not motivated to just substitute layers of different orientation because each specific orientation confers a specific benefit to the strength of the golf club shaft. The references teach that the specific order of the layers may also be important and one of ordinary skill in the art is not motivated to act contrary to that teaching.

Additionally, Jackson's invention is unlike both the present invention and all other references cited by the Examiner because Jackson's golf club shaft is composed of fiberglass. In contrast, the present invention and the other references are formed of fiber-reinforced polymer composites ("FRP"). One of ordinary skill in the art is aware that a golf club should maximize several key properties. In particular, the performance of all golf club shafts is affected by flexural rigidity, flexural strength, torsional rigidity, torsional strength, and crushing strength. One of ordinary skill in the art is also aware that each material that could be employed to make golf club shafts contributes differently to different properties. Any layering schemes taught by Jackson, or any other fiberglass club, are not obviously applicable to layering schemes demonstrated by an FRP

golf club shaft because the differences in bonding between and within layers of material yield significantly different wear resistant behaviors.

The present invention is comprised of a fiber-reinforced polymer composite material. Individual polymer fibers are held together within a single layer of FRP solely by the resin matrix. When layers of FRP are placed one on top of the other, as in the present invention, the resin from one layer connects and intermingles with the resins of the layers above and below. Thus, when the total FRP construction is cured, the resin bonds the parallel fibers of its own layer together as well as holds the fibers in multiple layers in place.

Fiberglass consists of a matrix of glass fibers aligned parallel to one another along a longitudinal axis. Into this matrix, a thermosetting resin is poured. Also mixed into this matrix are smaller glass fibers with a length less than the width of the total fiberglass layer. These fibers are strewn in at odd angles and form an additional strengthening and bonding layer. There are no such chopped fiber components present within the layers of FRP materials. One of ordinary skill in the art is aware that the physical properties gained by the specific fiberglass layers are not directly reproducible using the identical orientations of FRP layers. The bonding between the fiberglass layers and the FRP layers differ and thus the physical properties differ.

Jackson discloses a fiberglass golf shaft wherein

> the longitudinal fibers are continuous and uniformly distributed about the axis and throughout the length of the shaft and are bound together by the binder and by chopped fiber glass particles or chopped filaments; said particles are dispersed at random throughout the length of the shaft, the chopped particles being preferably of greater length than width.

Jackson, column 2, lines 26-33. Chopped glass fibers constitute a major reinforcing agent in the bonding of fiberglass layers, and could be considered to function as individual layers themselves.

Jackson layers fiberglass material one on the other and extra chopped fiber glass particles are placed along the interface in addition to the intermingling resin. The additional particles are distributed at a variety of angles with respect to the longitudinal axis of the golf shaft and serve an integral function by strengthening the bond between layers. Jackson states, "chopped fiber glass particles are disposed between the respective layers, and are distributed at random, lying in different directions securing the different layers together and securing the separate longitudinally extending glass fibers together and the helically wound fibers together." Jackson, column 2, lines 52-56. FRP materials do not include chopped fiber components between the FRP layers. The lack of chopped fiber components is another principle difference between fiberglass and FRPs that alters the resulting physical properties between the two substances and the resulting golf club shafts.

During the normal use of a golf club, the shaft comes under many tensions, stresses, and torsional forces that pull on the fibers in an FRP material or fiberglass in different manners. For FRP materials, the largest wear resistance (and hence greatest strength in a golf shaft under that particular stress) occurs when the force induces sliding of the fiber normal to its orientation. The lowest wear resistance is found when the fiber was inclined to slide transverse to its orientation. Applying a force to a fiber such that it was inclined to slide parallel to its orientation provides only slightly more wear resistance than a transverse slide.

Fiberglass and FRPs have sufficiently different material properties that one of ordinary skill in the art would not presume that a layer with beneficial properties in one type of club would provide the same beneficial properties in the other. Appellants have submitted that the wrapping of FRP layers in the present invention is novel and unobvious in light of Jackson, JP '131, Kusumoto, JP '840, Preece, and Cecka. Under most tensions or stresses the golf club shaft may encounter, the present arrangement of fibers possesses no layer that aligns fibers normal to the

longitudinal axis of the shaft. The novel arrangement of layers within the golf club shaft of the present invention with fibers transverse, parallel, or some angle in between transverse and parallel provides frictional wear resistance within the matrix fibers. The wrapping arrangement makes the club unusually strong and resistant to such forces while retaining a light weight. The strength and light weight of the golf club shaft of the present invention is notably achieved without the incorporation of any chopped fiber particles within or between layers, as is shown in Jackson.

Jackson teaches layers with fibers varying in angles between transverse and parallel to the shaft's longitudinal axis (but no actual transverse layer) and fibers parallel to the longitudinal axis. However, within the matrix of fibers in each layer and between layers there are short, chopped bits of glass fiber arranged at varying angles. Some of these fibers will be normal (or arranged at an angle between normal and transverse or normal and parallel to the shaft's longitudinal axis) and they provide additional connecting strength and resistance to friction, force, and other wear-inducing forces for Jackson's invention. Jackson teaches that the "chopped fibers ... oppose shear forces tending to fracture the shaft." Jackson, column 3, lines 55-58. The chopped fibers add wear resistant properties in a manner which cannot be directly emulated by any FRP golf club shaft.

The connectivity between fiberglass layers arranged around a mandrel, as in the formation of a golf club shaft in Jackson, is entirely different than the formation of FRP layers around a mandrel, as in the present invention. As above, fiberglass has small, chopped fibers dispersed within each individual layer's matrix and between the layers that are strewn at a variety of angles. The chopped fibers provide different connecting strength, resistance to force, and other wear resistant properties unlike those available in FRPs.

Appellants submit that one of ordinary skill in the art is not motivated to combine the teachings of Jackson with JP '131, Kusumoto, JP '840, Preece, and Cecka because the bonding

between layers of fiberglass and the bonding between layers of FRP material are substantially different. The differences in the bonding alters the wear resistant properties of the shafts in question such that comparisons between the two systems cannot fairly be drawn. The use of chopped fibers between and within fiberglass layers is a separate technique and, although analogous, is not equivalent to the use of FRPs without chopped particles.

The disclosed inventions of JP '131, Kusumoto, JP '840, Preece, and Cecka are all specified as composed of FRP materials. None of the five FRP references disclose or suggest, alone or in combination, the entire claimed invention. By the same reasoning used to dispute combinations between any FRP layering scheme and a fiberglass layering scheme, Appellants submit that combinations of the layering schemes of the five references with Jackson's fiberglass golf shaft are similarly nonobvious.

Appellants respectfully submit that the present invention provides a specific number, orientation, and specific ordering of the layers. The Examiner is treating mixing and matching layers as obvious without any consideration of the material differences between references. One of ordinary skill in the art, in general, is not motivated to add or subtract a specific layer without direct teaching as this would affect the properties of the golf club shaft, nor is one motivated to interchange fiberglass and FRP layering schemes.

In conclusion, none of the references, alone or in combination, teach or suggest all of the elements of the presently claimed invention. Additionally, neither the references nor the Examiner's comments provide sufficient motivation to one of ordinary skill in the art to combine the references. The Examiner is improperly using hindsight by using the disclosure of the present invention to assemble the disparate parts of the references to render obvious the present invention. Thus, Appellants respectfully request that the above rejection be withdrawn.

CONCLUSION

For the foregoing reasons, the rejection of claims 1, 21, and 22 should be reconsidered by the Examiner or reversed in its entirety by the Board. Claims 1, 21, and 22 are patentable over the prior art of record. Accordingly, the Examiner's finding of unpatentability should be reversed. Such a disposition is earnestly solicited.

Dated: February 20, 2004

Respectfully submitted,

By _____

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